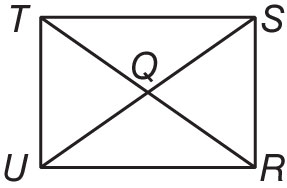
**6-4 Study Guide and Intervention**

***Rectangles***

**Properties of Rectangles** A **rectangle** is a quadrilateral with four right angles.   
Here are the properties of rectangles. A rectangle has all the properties of a parallelogram.

• Opposite sides are parallel.

• Opposite angles are congruent.

• Opposite sides are congruent.

• Consecutive angles are supplementary.

• The diagonals bisect each other.

Also:

• All four angles are right angles. ∠*UTS*, ∠*TSR*, ∠*SRU*, and ∠*RUT* are right angles.

• The diagonals are congruent. ≅

**Example 1: Quadrilateral *RUTS* above is a rectangle. If *US* = 6*x* + 3 and *RT* = 7*x* – 2, find *x*.**

The diagonals of a rectangle are congruent, so *US* = *RT*.

6*x* + 3 = 7*x* – 2

3 = *x* – 2

5 = *x*

**Example 2: Quadrilateral *RUTS* above is a rectangle. If *m*∠*STR* = 8*x* + 3 and *m*∠*UTR* = 16*x* – 9, find *m*∠*STR*.**

∠*UTS* is a right angle, so *m*∠*STR* + *m*∠*UTR* = 90.

8*x* + 3 + 16*x* – 9 = 90

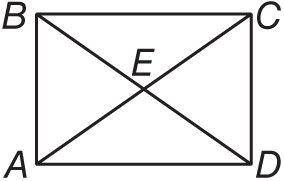
24*x* – 6 = 90

24*x* = 96

*x* = 4

*m*∠*STR* = 8*x* + 3 = 8(4) + 3 or 35

**Exercises**

**Quadrilateral *ABCD* is a rectangle.**

**1.** If *AE* = 36 and *CE* = 2*x* – 4, find *x*.

**2.** If *BE* = 6*y* + 2 and *CE* = 4*y* + 6, find *y*.

**3.** If *BC* = 24 and *AD* = 5*y* – 1, find *y*.

**4.** If *m*∠*BEA* = 62, find *m*∠*BAC*.

**5.** If *m*∠*AED* = 12*x* and *m*∠*BEC* = 10*x* + 20, find *m*∠*AED*.

**6.** If *BD* = 8*y* – 4 and *AC* = 7*y* + 3, find *BD*.

**7.** If *m*∠*DBC* = 10*x* and *m*∠*ACB* = – 6, find *m*∠ *ACB*.

**8.** If *AB* = 6*y* and *BC* = 8*y*, find *BD* in terms of *y*.

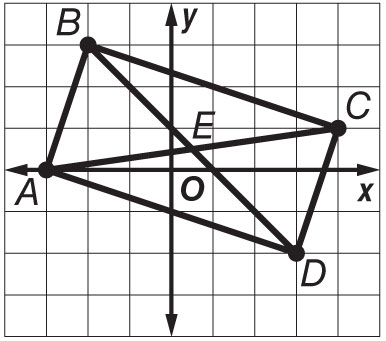
**6-4 Study Guide and Intervention** *(continued)*

***Rectangles***

**Prove that Parallelograms Are Rectangles** The diagonals of a rectangle are congruent, and the converse is also true.

If the diagonals of a parallelogram are congruent, then the parallelogram is a rectangle.

In the coordinate plane you can use the Distance Formula, the Slope Formula, and properties of diagonals to show that a figure is a rectangle.

**Example: Quadrilateral *ABCD* has vertices *A*(–3, 0), *B*(–2, 3), *C*(4, 1), and *D*(3, –2).   
Determine whether *ABCD* is a rectangle.**

***Method 1:*** Use the Slope Formula.

slope of = = or 3 slope of = = or

slope of = = or 3 slope of = = or

Opposite sides are parallel, so the figure is a parallelogram. Consecutive sides are perpendicular, so *ABCD* is a rectangle.

**Method 2:** Use the Distance Formula.

*AB* = or *BC* = or

*CD* = or *AD* = or

Opposite sides are congruent, thus *ABCD* is a parallelogram.

*AC* = or *BD* = or

*ABCD* is a parallelogram with congruent diagonals, so *ABCD* is a rectangle.

**Exercises**

**COORDINATE GEOMETRY Graph each quadrilateral with the given vertices. Determine whether the figure is a rectangle. Justify your answer using the indicated formula.**

**1.** *A*(–3, 1), *B*(–3, 3), *C*(3, 3), *D*(3, 1); Distance Formula

**2.** *A*(–3, 0), *B*(–2, 3), *C*(4, 5), *D*(3, 2); Slope Formula

**3.** *A*(–3, 0), *B*(–2, 2), *C*(3, 0), *D*(2 –2); Distance Formula

**4.** *A*(–1, 0), *B*(0, 2), *C*(4, 0), *D*(3, –2); Distance Formula